Claims:

We Claim:

1. A method for the analysis of organisms, cells or both organisms and cells; said method comprising:
   a) collecting a sample of organisms or cells;
   b) adding one or more fixative agents to the sample to thereby fix the organisms, cells or both;
   c) treating the sample with one or more molecular probes, under suitable hybridization conditions, such that the organisms, cells or both react with the molecular probe in a way that produces detectable or independently detectable organisms, cells or both; and
   d) determining one or more of the detectable organisms or cells in the sample; wherein the fixative agent or agents and excess molecular probe or probes are not separated from the organisms or cells prior to making the determination.

2. The method of claim 1, wherein the organisms, cells or both are collected from a growth medium.

3. The method of claim 1, wherein the organisms, cells or both are collected directly from a sample that has not been treated for growth.

4. The method of claim 2, wherein the growth medium is not completely separated from the sample of organisms, cells or both.

5. The method of claim 2, wherein the growth medium is selected from the group consisting of broth and agar.

6. The method of claim 1, wherein a blocking agent is present during the operation of step (c).

7. The method of claim 6, wherein the blocking agent is casein.

8. The method of claim 1, wherein steps (b) and (c) are performed simultaneously.

9. The method of claim 1, wherein steps (b) and (c) are performed sequentially in that order.

10. The method of claim 1, wherein the molecular probe is labeled with a fluorophore.

11. The method of claim 1, wherein two or more independently detectable molecular probes are used in the method for the multiplex analysis of two or more different types of organisms or cells in the sample.

12. The method of claim 11, wherein the two or more independently detectable molecular probes are labeled with independently detectable fluorophores.

13. The method of claim 1, wherein the molecular probe is a self-indicating molecular probe selected from the group consisting of a linear beacon, a nucleic acid or PNA molecular beacon and an intercalating beacon.

14. The method of claim 1, wherein the molecular probe is a detection complex.

15. The method of claim 1, further comprising:

e) adding a quencher labeled oligomer before the determination is made to thereby form a complex between the excess molecular probe and the quencher labeled oligomer.

16. The method of claim 1, wherein the cells or organisms of the sample are determined using either a microscope, an array scanner or a flow cytometer.

17. The method of claim 1, wherein one or more blocking probes are present during the operation of step (c).

18. The method of claim 1, wherein the molecular probe is a nucleic acid probe.

19. The method of claim 1, wherein the molecular probe is a non-nucleic acid probe.

20. The method of claim 19, wherein the non-nucleic acid probe is a peptide nucleic acid probe.

21. A method for determining organisms, cells or both, said method comprising:

a) treating a sample of fixed cells, organisms or both, that have been grown in a medium, with one or more detectable molecular probes, under suitable hybridization conditions, in a way that produces stained organisms, cells or both stained organisms and cells; and

b) determining the stained cells, organism or both the stained organisms and cells;

wherein said assay does not require that the medium be removed or separated from the organisms, cells or both the organisms and cells.